

This Page Is Inserted by IFW Operations
and is not a part of the Official Record

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images may include (but are not limited to):

- BLACK BORDERS
- TEXT CUT OFF AT TOP, BOTTOM OR SIDES
- FADED TEXT
- ILLEGIBLE TEXT
- SKEWED/SLANTED IMAGES
- COLORED PHOTOS
- BLACK OR VERY BLACK AND WHITE DARK PHOTOS
- GRAY SCALE DOCUMENTS

IMAGES ARE BEST AVAILABLE COPY.

**As rescanning documents *will not* correct images,
please do not report the images to the
Image Problem Mailbox.**

(12) UK Patent Application (19) GB (11) 2 275 309 (13) A

(43) Date of A Publication 24.08.1994

(21) Application No 9303513.7

(22) Date of Filing 22.02.1993

(71) Applicant(s)
Tai-Her Yang
5-1 Taipin Street, Si-Hu Town, Dzan-hwa, Taiwan

(72) Inventor(s)
Tai-Her Yang

(74) Agent and/or Address for Service
Withers & Rogers
4 Dyer's Buildings, Holborn, LONDON, EC1N 2JT,
United Kingdom

(51) INT CL⁵
B60K 6/04, F01K 27/00, F02B 61/00, H02J 7/14

(52) UK CL (Edition M)
F1Q QDD Q112 Q216 Q221 Q311 Q313 Q314 Q519
B7H HDE H562 H571 H572 H576 H742 H745
F2D DLA D501 D506 D507
H2H HAF HBCA HBCB
U1S S1820 S1834 S1839 S1903 S1988 S2047

(56) Documents Cited
GB 2235952 A GB 1440484 A GB 1280870 A
GB 0644098 A GB 0476729 A EP 0233079 A2

(58) Field of Search
UK CL (Edition L) B7H HDE, F1Q QCA QCX QDD QEA

(54) Power generating system having an electric motor/generator unit.

(57) The power system is used to drive vehicles, ships, air craft, or other mechanical devices or industrial equipment. It comprises an internal combustion engine P101, turbine or other power source connected through differential gearing 100, belt, chain, or other coupling means to a brush or brushless alternating or direct current motor/generator unit M101. Control devices D101 and CCU101 are provided to control the supply of power between the motor/generator unit M101, and a battery BT101. A brake B103 is also provided. Alternative arrangements of heat engine and motor/generator units are also disclosed (Figs 2 to 6) with direct or differential drive couplings.

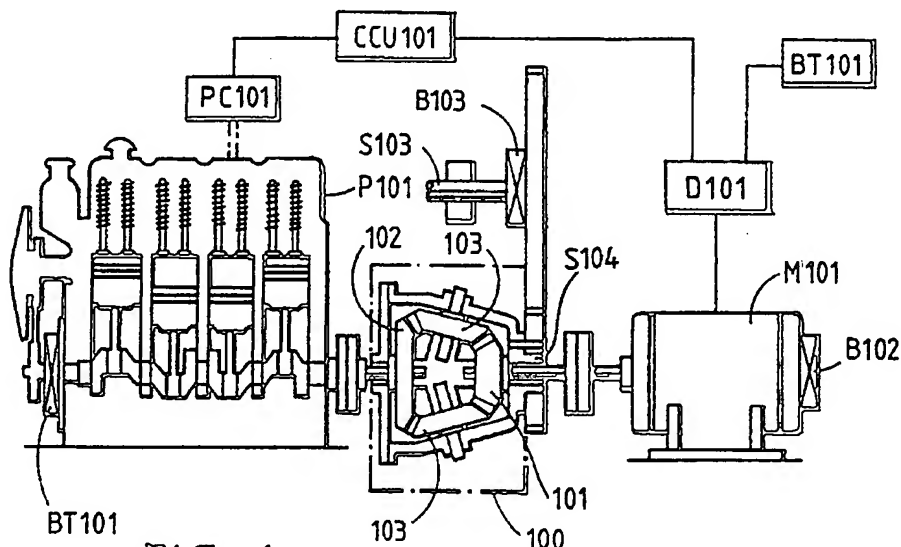
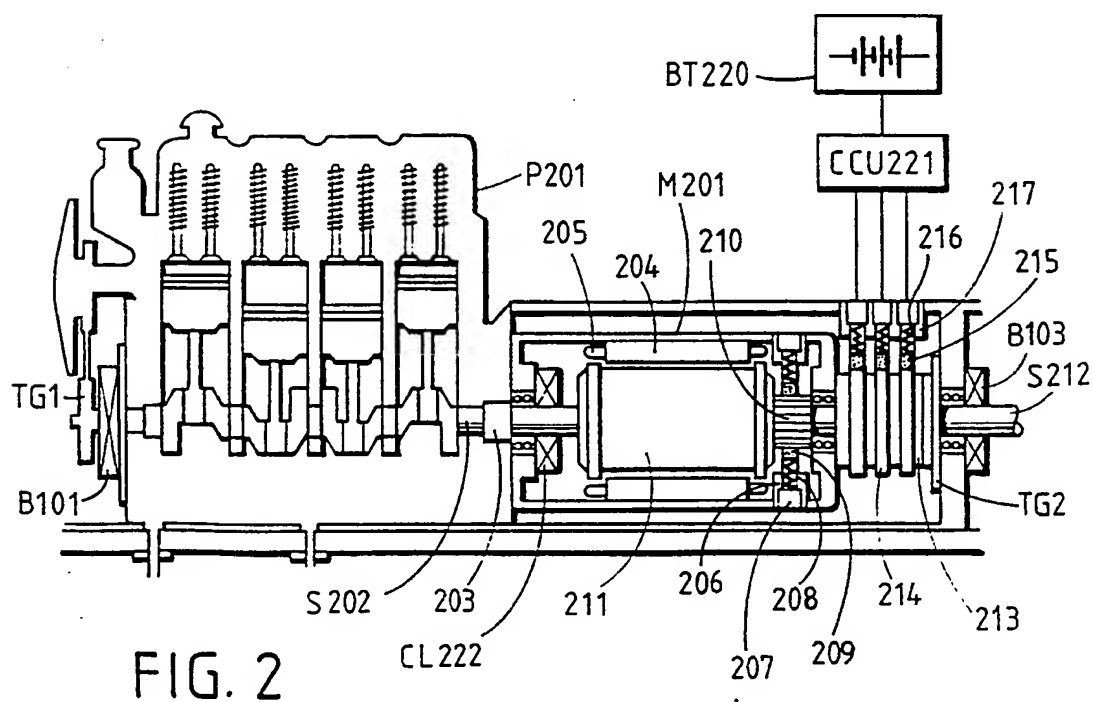
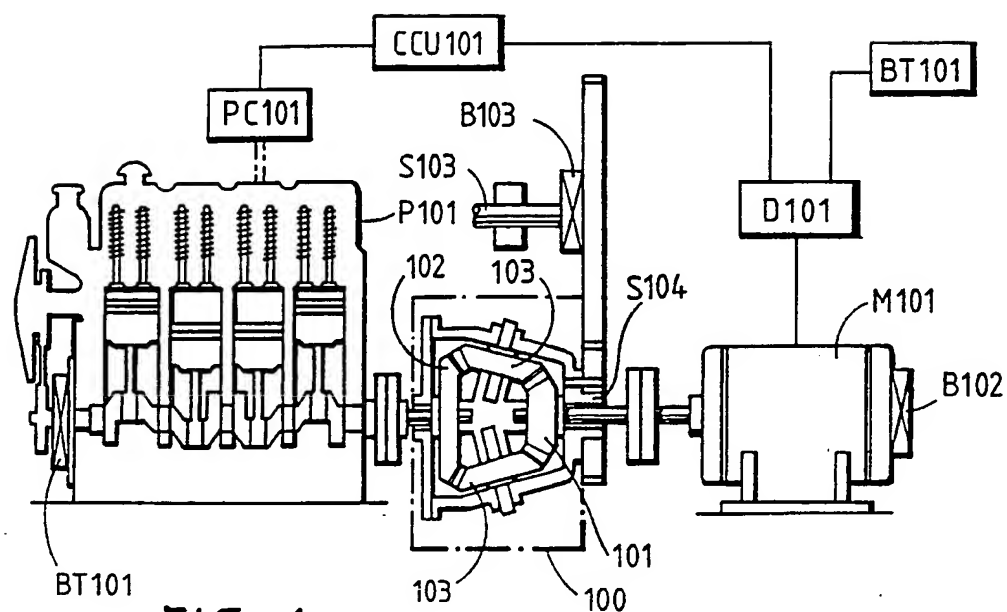


FIG. 1

GB 2 275 309 A



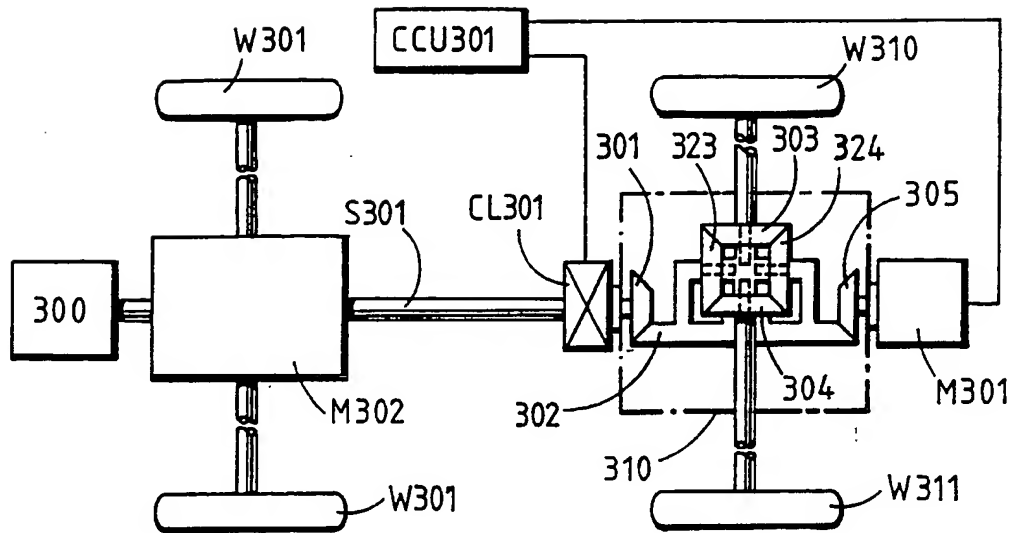


FIG. 3

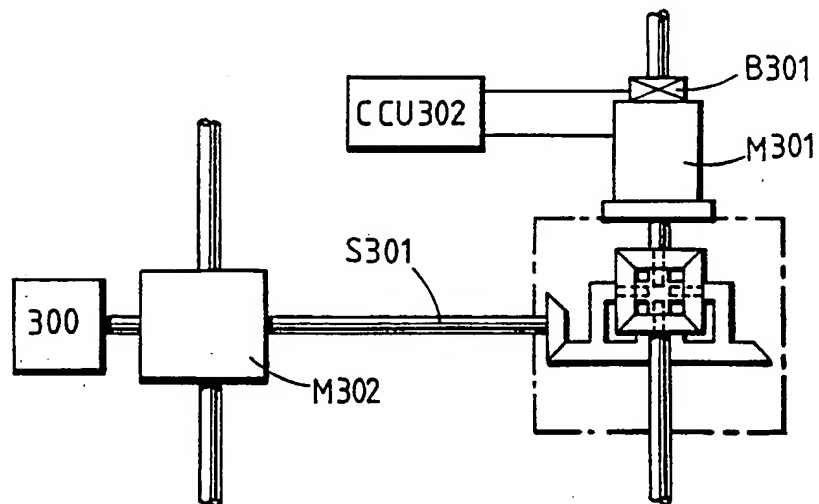


FIG. 3A

4/5

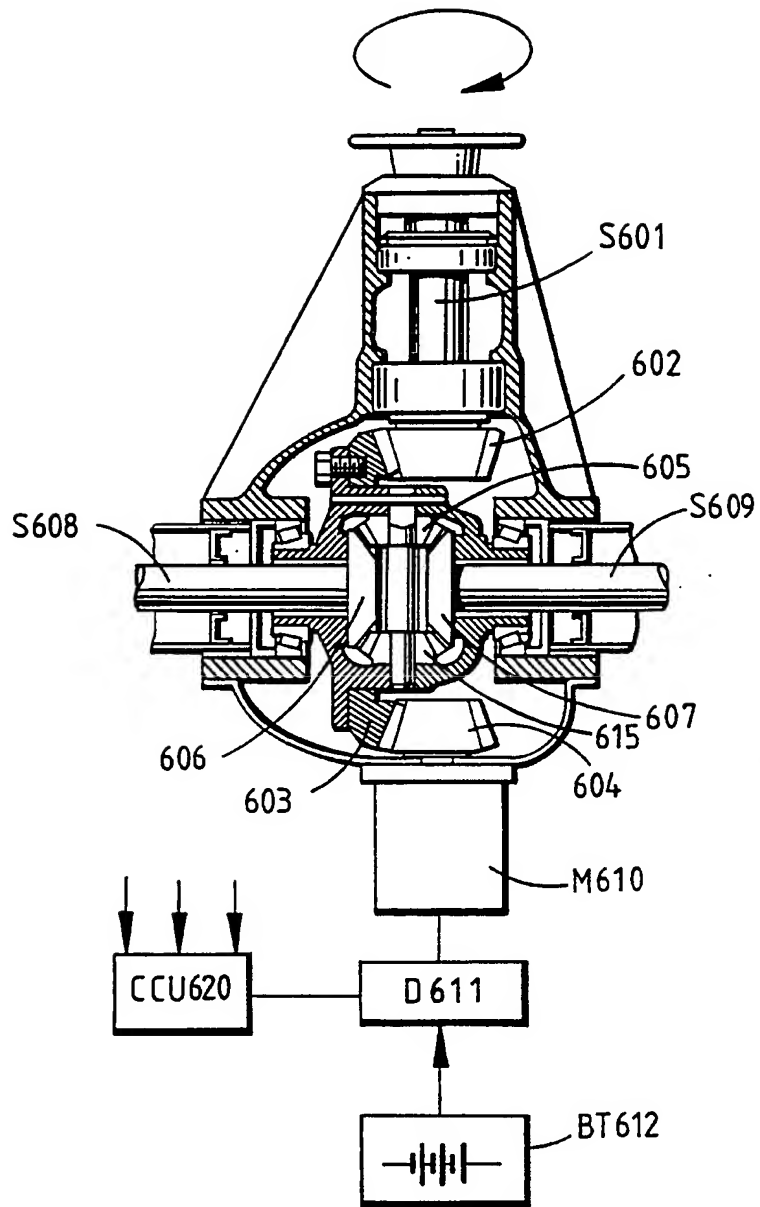


FIG. 6

5/5

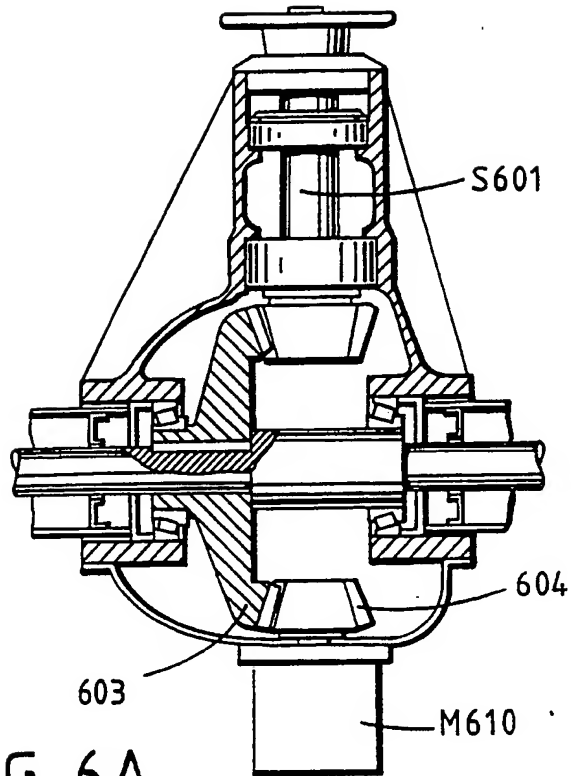


FIG. 6A

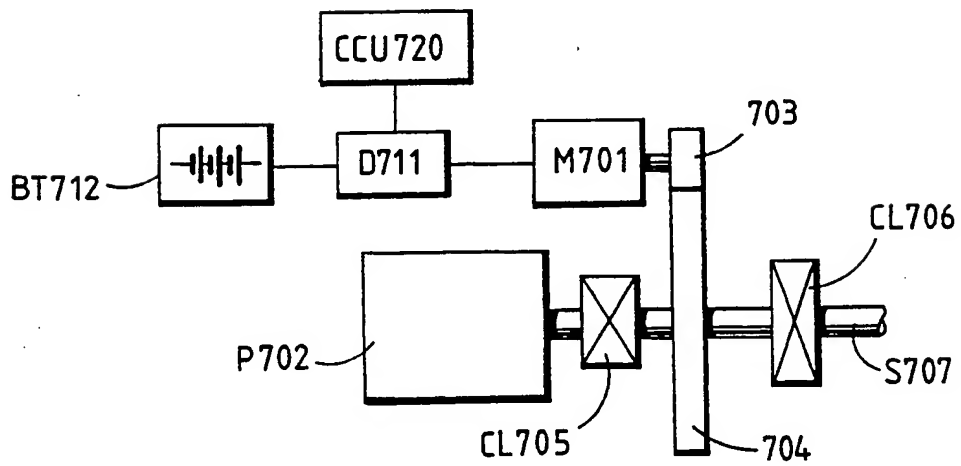


FIG. 7

TITLE: DIFFERENTIAL COUPLING AND COMPOUNDING POWER
SYSTEM OF ELECTRIC TRANSMISSION STORING TYPE

5 SUMMARY OF THE INVENTION:

The differential coupling and compounding power system of electric transmission storing type is used to drive gyroscopically the traffic vehicles, ships, air crafts, and other mechanic devices (or other industrial equipment). It is directly connected to a input shaft of a magnetic coupling driving device through a gyroscopic output shaft of an internal fire engine (or other gyroscopic power source) or through a transmission gear, belt, chain, or coupler. The magnetic coupling is a brush or brushless alternate or direcct current dynamo through differential gear and engine output shaft coupling, or it is a dual end shaft of which either end is respectively connected to a turnable magnetic field and a turnable rotor so as to be controlled by a control device and to generate the driving function of a motor when current is input; or it is used to generate power and output power and produce the transmission coupling function through coupling torsional moment of output current, or to start an engine and to brake the reproducing power, especially to charge the battery through the turning speed difference between gyroscopic magnetic field and rotor when the engine is individually driving. To control the charging current, it can get the turning

speed difference between current adjustment and loading. The engine can be in a constant speed or partially modulated speed so as to keep a higher speed and lower pollution work speed and its magnetic coupling driving device produces differential speed output; that is, it can be provided with a charging power for a battery and a transmission coupling to improve the engine's efficiency and reduce the pollution. Rather, it can also be used as a driving motor solely for a gyroscopic output driving load or used together with the engine for a gyroscopic driving load.

BRIEF DESCRIPTION OF THE DRAWING:

FIG 1 is an embodiment of the differential coupling and compounding power system of electric transmission storing type which is reacting for a differential coupling through a differential gear.

FIG 2 is an embodiment of the differential coupling and compounding power system of electric transmission storing type which is formed by means of dual motive magnetic coupling driving device.

FIG 3 is an embodiment of the differential coupling and compounding power system of electric transmission storing type which is in cascade load.

FIG 3A is an embodiment of the differential coupling and compounding power system and structure of electric

transmission storing type which is output from rear shaft and one side.

FIG 4 is another embodiment of the differential coupling and compounding power system of electric transmission storing type which is in cascade load.

FIG 5 is an embodiment of the differential coupling and compounding power system of electric transmission storing type which is formed by means of series dual differential gear.

FIG 6 is an embodiment of the differential coupling and compounding power system of electric transmission storing type which can drive an engine power system through a load control value-gaining torsional force of an auxiliary dynamo.

FIG 6A is an embodiment of the system in FIG 6 of which its rear end load side is provided for driving a soly output shaft.

FIG 7 is an embodiment of the differential coupling and compounding power system of electric transmission storing type of which the auxiliary dynamo gear is matched with the primary side gear of its engine.

DETAILED DESCRIPTION OF THE INVENTION

In recent years, energy and noise pollution became more serious than before power driven vehicles are more suitable for reducing pollution. In view of the research and development on the power vehicles, not much has been done because the capacity of the battery is limited. If the volume of the battery is increased to overcome the limits, more power will be wasted because the weight of the vehicle should be increased, too. It is not economic, so when the technological problems are not solved, the more practical way to drive vehicles is the multiple driving device as follows:

(A) Many kinds of power are used:

The most typical kind of electric automobile is the one which uses its engine to drive the generator to produce power for its battery and then the battery supplies power to drive the motor for a car. However, this kind of car is not efficient enough, such as GM HX3 of American car;

(B) Coaxial type:

This kind of car uses the power output shaft of the engine to connect to the rotating shaft of driving motor by means of the clutch series so as to drive the car and control its speed, such as VW CHICO of the German folks' car.

Besides, only either the above-mentioned engine or motor in (B) can be chosen to output driving so their power can not be added to each other.

5 The present invention is to describe an embodiment of the differential coupling and compounding power system of electric transmission storing type which uses the output shaft of an engine (or other gyroscopic power source) to connect with a
10 magnetic coupling driving device, which is a brush or brushless alternate or direct current dynamo through differential gear and engine output shaft coupling, or which is a dual end shaft of which either end is respectively connected to a turnable magnetic field and
15 a turnable rotor, or which is formed by a turning shaft (or a shaft of magnetic field) of gyroscopic rotors used as a main output shaft; this kind of device which can produce the engine output and magnetic coupling driving device itself can produce the output
20 and their output power and speed can be added to each other, and their adding process will not be affected by their speed relation between them. So the volume of this system can be smaller, it becomes compact, its cost is reduced. It can be controlled by the control
25 device and it can have the driving function of a motor when current is input in it. It is also used to generate power and output power and produce the transmission coupling function through coupling torsional moment of output current, or to start an
30 engine and to brake the reproducing power, especially

to charge the battery through the turning speed difference between gyroscopic magnetic field and rotor when the engine is individually driving. To control the charging current, it can get the turning speed difference between current adjustment and loading. The engine can be in a constant speed or partially modulated speed so as to keep a higher speed and lower pollution work speed and its magnetic coupling driving device produces differential speed output; that is, it can be provided with a charging power for a battery and a transmission coupling to improve the engine's efficiency and reduce the pollution. Rather, it can also be used as a driving motor solely for a gyroscopic output driving load or used together with the engine for a gyroscopic driving load.

This invention can be illustrated as follows according to the attached drawing figures:

FIG 1 is an embodiment of the differential coupling and compounding power system of electric transmission storing type which is reacting for a differential coupling through a differential gear. The main structure in FIG is as follows:

25

-- Primary side gyroscopic power source P101 : It is usually an internal fire engine, but in practical use, the external combustion engine, wind and water power, and other gyroscopic power source can also be used.

30 The primary side gyroscopic power source has a brake

B101 for the need of operation system to lock the primary side gyroscopic output shaft. The primary side gyroscopic power source also has a speed or power controller PC101 (e.g. it is used as the oil controller when the internal fire engine is used as a primary side gyroscopic power source) so as to receive manual or the CCU101 control;

-- Differential gear 100: it includes the sun gear 101 of the magnetic coupling driving device; it is composed of the outer ring gear 102 of the primary side gyroscopic power source and the loose star gear 103 for the differential output. The loose star gear has an output coaxial shaft S104;

-- Magnetic coupling driving device M101: it has rotors and magnetic field and in system operation it can be used as a motor when power is input, or as a generator to charge a battery when the inertia of the system is turned into electric power, or by means of the distribution of the differential gear it can receive the driving motive force of part of the primary side gyroscopic power source and can be used as a generator to charge a battery. It and the system output load are together formed into a load of the primary side gyroscopic power source. By means of adjusting the power for the battery, it can adjust the turning speed difference between the system output load and the primary side gyroscopic power source, especially when the power source is an engine. In this way, the engine can operate better and keep to control the turning

speed of the load driving; the magnetic coupling device M101 provides a damping to drive the engine directly, it can use the magnetic coupling driving device as a generator to output a constant current which provides a reproduced power brake damp, or add a brake device B102 between the gyroscopic field of the magnetic coupling driving device and the turnable rotors so as to provide a mechanic brake; the magnetic coupling driving device and the structure of turnable rotors are comprised of generator and dynamo, which consist of constant magnetic or coil exciting fields and rotors of constant magnetic iron or slide ring conductive coil rotors, or consists of series wound, shunt wound, or multiple wound, or synchronizing brushless dynamo or stepping dynamo;

15

-- control element D101 of magnetic coupling driving device: It can receive orders from CCU101 to supply power to control charge or discharge the voltage and current between the magnetic coupling driving device and battery and to control the armature constant current output and the magnetic coupling driving device itself provides a magnetic brake damping:

20

-- Battery BT101: all kinds of battery which can charge and discharge power;

25

-- Output shaft S103: a gyroscopic output end of the system for a driving load, when necessary a brake B103 can be attached on it, and in the following system operation, the system load can be used as a damping or

30

further used together with a brake B103 as a damping supplier;

5 -- CCU101: It consists of solid circuit or dynamo elements to receive manual or signal control order so as to control the system and act out the whole or part of the function as following Table 1:

10 The function Table 1 of the FIG 1 are as follows:

F1-A, F1-B, F1-C, F1-D: a system operation for load lower speed output driving;

15 F2: a system operation for battery power input magnetic driving device for motor operation to drive load;

20 F3: a system operation for driving engine and battery power input coupling driving device for motor operation to reach the output turing speed and power increasing as a big power output;

25 F4: a system operation for load side mechanic motive power feedback driving magnetic coupling driving device as a generator for receiving power back into battery;

30 F5: a system operation for engine driving magnetic coupling driving device for generator charging the battery; this function can further control the charging time automatically in advance;

F6: a motor operation for a magnetic coupling driving device by means of battery power to drive a motor and start an engine.

5

10

15

20

25

30

Table 1

Element \ Function		B101	B102	B103	P101	(H101) G/H	BT101
F1-A	B102 closed for controlling engine oil valve from low speed control driven to medium speed.	OFF	ON	OFF	0-HAX	STOP	STOP
F1-B	H101 and engine oil valve controlled from low speed to medium speed and charging at the same time.	OFF	OFF	OFF	0-HAX	GEN.	CHARGE
F1-C	H101 controlled by the engine constant speed for changing the load output power of the current charged to the battery.	OFF	OFF	OFF	CONSTANT SPEED	GEN.	CHARGE
F1-D	H101 controlling output speed by a short cut.	OFF	OFF	OFF	CONSTANT SPEED	GEN.	STOP
F2	Battery power drives H101 to transmit and output forward and backward.	ON	OFF	OFF	STOP	MOTOR	DIS-CHARGE
F3	H101 controlled and the engine rotated to add speed and power of the motor to each other.	OFF	OFF	OFF	HAX	MOTOR	DIS-CHARGE
F4	H101 as a generator for receiving motive force and turning it into power for charging the battery.	OFF	OFF	OFF	SLOW	GEN.	CHARGE
		ON	OFF	OFF	STOP	GEN.	CHARGE
F5	System charged automatically (stop at a set time)	OFF	OFF	ON	0-HAX	GEN.	CHARGE
F6	H101 as an engine to start motor	OFF	OFF	ON	START		

Note : (1) Charge of F1-B is distribute for current according to the load.

(2) H101 a magnetic coupling driving device.

(3) P101 and H101 series is a primary side gyroscopic power source; e.g. engine .

(4) BT101 a battery.

FIG 2 is an embodiment of the differential coupling and compounding power system of electric transmission storing type which is formed by means of dual motive magnetic coupling driving device.

5

It is directly connected to a input shaft of a magnetic coupling driving device through a gyroscopic output shaft of an internal fire engine or through a
10 transmission gear, belt, chain, or coupler. The magnetic coupling driving device is a dual end shaft of which either end is respectively connected to a turnable magnetic field and turnable rotors so as to be controlled by a control device and to generate the
15 driving function of a motor when current is input; or it is used to generate power and output power and produce the transmission coupling function through coupling torsional moment of output current, or to start an engine and to brake the reproducing power,
20 when the engine is soly rotated to output driving load or rotate with the engine to ouput driving load; for example, when engine is soly driven, it can be used as a transmittable coupling device, and there provided a magnetic or liquid or mechanic driving clutch between
25 gyroscopic magnetic field andturnable rotors to act out a coupling between magnetic field and rotors so as to transmit directly and to control the speed by controlling the engine when it is closed. The main structure of the FIG 2 can be illustrated as follows:
30 -- internal fire engine P201 is driven by the materials

such as gasoline, diesel, alcohol, gas, and hydrogen;
-- primary output shaft of internal fire engine S202 ;
--coupler 203: it can be a board coupler, universal
joint, or other conventional shaft-to-shaft or
5 shaft-to-coaxial gyroscopic coupling devices;
-- turnable driving field 204 of the magnetic coupling
driving device M201: a fixed mechanic structure which
has a bearing and can bear this structure by means of
coupler 203 directly coupled to the internal fire
10 engine primary gyroscopic output shaft, or by means of
the transmission devices, such as gear, belt, and chain
so as to receive the driving of the engine output
shaft;
-- constant magnetic exciting coil 205: it is
15 controlled by the CCU221, and is conducted to an
exciting magnetic current which can control its
polarity and current volume input through a conductive
ring, or further, it consists of A.C. or D. C. converter
dynamo of constant magnetic iron field, or brushless
20 synchronical or differential dynamo.
--insulated sleeve of armature conductive brush seat
206;
--cap of armature conductive brush seat 207;
--armature conductive brush seat 208;
25 --armature conductive brush 209;
--gyroscopic armature exchanger 210: if the magnetic
coupling device is a converter dynamo for rotors to
change phase and for conduction, its structure can be
cylindric or board, and its brush and brush seat are
30 fixed at its outside or side;

--turning rotor 211: it can be a converter armature and
 a cylindrical D.C. armature having a conventional coil
 and tooth iron core, or a printing armature rotor
 structure, or a cup armature rotor structure, or a iron
 5 coreless armature rotor structure, or other A.C. or
 D.C. dynamo structure, if it is a brushless one, it
 contains constant magnetic iron;
 --output shaft of armature rotor S212;
 --conductive slip ring insulated sleeve 213;
 10 --armature and magnetic field output/input conductive
 ring 214: respectively connected to armature
 output/input conductive brush seat and connected to
 both ends of the magnetic field exciting magnetic coil;
 if it is a brushless one, the brush and brush seat can
 15 be omitted when necessary;
 --coupled to brush 215 of conductive ring;
 --coupled to brush seat 216 of conductive ring;
 --coupled to conductive ring brush insulated seat 217;
 --internal fire engine primary output shaft magnetic
 20 brake B101: it connects with the output shaft through
 keys or pins and has a braking function when it has
 power; it can be replaced by a mechanic braking device
 in a manual, hydrostatic, air or oil pressure way of
 operation, and it can be used when a driving is
 25 necessary;
 --output side magnetic brake device B103 of the magnetic
 coupling driving device: it connects with the output
 shaft through keys or pins and has a braking function
 when it has power; it can be replaced by a mechanic
 30 braking device in a manual, hydrostatic, air or oil

pressure way of operation, and it can be used when a driving is necessary;

--battery BT220: it can also choose any kinds of charging and discharging battery or fuel battery;

5 --engine speed feedback speed-inspecting generator TG1: it is deviced when necessary, and it is coupled to primary output shaft and can produce an analog or digital signal for the engine speed by means of the electric or magnetic effect, and a transmission device
10 which has a positive contrast with the engine speed can be selected to replace its coupling position;

-- output shaft speed generator TG2: it is deviced when necessary, and it is a coupled to output side armature rotor output shaft or to a driving gear at a position
15 where the rotating speed of the output shaft is in positive contrast with its driving gear, and can produce an analog or digital signal for the engine speed by means of the electric or magnetic effect;

--Central control unit CCU221: it is comprised of
20 conventional switch, potential device, photoelectric device, solidor dynamo element, micro-computer, including control element and driving interface unit;

--clutch device CL222 between gyroscopic field of magnetic coupling driving device H201 and turnable
25 rotor: It is controlled by the magnetic, fluid, or mechanic force, when OFF is open, magnetic field and rotor will rotate to each other, when On is closed, magnetic field and rotor will be directly locked and transmitted.

30

Other circumferential device, such as magnetic oil valve adjustment driving device, which can be devised when necessary; its engine rotates in constant speed by means of the feedback of TG1 so as to adjust the driving for the oil valve; auxiliary generator can be a D.C. or A.C generator by means of a converter, it also can receive the driving of an engine to produce power through belt, or other transmission devices; voltage converter automaticall controls the generator in different engine speed to produce a stable charging voltage for charging a battery.

15

20

25

30

Table 2

Element \ Function	8101	CL222	8103	P201	(M201) G/M	8T220
F1-A CL222 closed for controlling engine oil valve from low speed control driven to medium speed.	OFF	ON	OFF	0-MAX	STOP	STOP
F1-B M201 and engine oil valve controlled from low speed to medium speed and charging at the same time.	OFF	OFF	OFF	0-MAX	GEN.	CHARGE
F1-C M201 controlled by the engine constant speed for changing the load output power of the current charged to the battery.	OFF	OFF	OFF	CONSTANT SPEED	GEN.	CHARGE
F1-D M201 controlling output speed by a short cut.	OFF	OFF	OFF	CONSTANT SPEED	GEN.	STOP
F2 Battery power drives M201 to transmit and output forward and backward.	ON	OFF	OFF	STOP	MOTOR	DIS-CHARGE
F3 M201 controlled and the engine rotated to add speed and power of the motor to each other.	OFF	OFF	OFF	MAX	MOTOR	DIS-CHARGE
F4 M201 as a generator for receiving motive force and turning it into power for charging the battery.	OFF	OFF	OFF	SLOW	GEN.	CHARGE
	ON	OFF	OFF	STOP	GEN.	CHARGE
F5 System charged automatically (stop at a set time)	OFF	OFF	ON	0-MAX	GEN.	CHARGE
F6 M201 as an engine to start motor	OFF	OFF	ON	START		

Note: (1) Charge of F1-B is distribute for current according to the load.

(2) M201 a magnetic coupling driving device.

(3) P201 and M201 series is a primary side gyroscopic power source; e. g. engine.

(4) 8T220 a battery.

FIG 3 is an embodiment of the differential coupling and compounding power system of electric transmission storing type which is in cascade load.

5 FIG 3 can be mainly illustrated as follows:

--primary side gyroscopic power unit 300: it is an internal fire engine;

--front end load W301: it is a two units of front wheel driven and ground driving damping load or other load;

10 --central gear box and transmission device and operation mechanism interface of front load M302 (including automatical or manual gearing control system of traditional front wheel transmission): except for the driving front end load, it has a backward extending

15 unit or more than a unit of central shafts S301 which has an output rotating number of the front end load with an adequate rotating speed rate, (similar to the rear wheel transmission central shaft of the backward extending four wheel transmission), its traits are a

20 controlable clutch CL301 is fitted between the central shaft and the rear end differential gear box so as to transmit the primary side gyroscopic motive force to the rear differential speed gear box, or to transmit the motive force from the rear end differential gear
25 box to the front end load, or to make the two motive forces transmitted to each other, or its clutch is a manual, fluid, mechanic, controllable one, or an electrically controlled magnetic one;

--rear end differential gear box 301: a small gear 301
30 receives the driving of a clutch and moves a matched

big gear 302, which is connected with two differential gears 323,324, respectively driving two output gears 303,304 and two loads W310, W311 moved by two output shafts; big gear 302 is matched with two small gears for two power sources, wherein front end small gear 301 for clutch CL301 is led to primary gyroscopic power unit, a small gear 305 coupled to rear end is led to magnetic coupling driving device M301;

--magnetic coupling driving device M301: a driving motor comprised of A.C. or D.C. brush or brushless dynamo armature for a driving load provided by the small gear 305 driven and matched by the big gear 302 of a differential gear system, if the motor chosen can change the mechanic feedback power into electric power as a kind of reproduced power, it can produce a damping by means of the reproduced power; this device M301 has a trait that the smaller the load the higher the speed, a mechanic trait of series wound, or auxiliary multiple wound auxiliary dynamo, or a current value controlled (including constant current control) A.C. or D. C. brush or brushless dynamo so as to have a function of a control value increasing according to the load, so that the following F14 function and the primary side gyroscopic power source are driven together to increase the torsional moment for an auxiliary driving;

--central control unit CCU301: it is comprised of a dynamo and a solid electronic element, it is a reference to a load state (e.g. oil valve state) and a driving state (e.g. speed) of an operative order and primary side gyroscopic power source so as to control

magnetic coupling driving device as to a generator, a motor, or a break idle state, and CCU301 is secured to or loose to the clutch CL301 by a control.

5 The system has the following functions in addition to the above-mentioned function:

F11: primary side gyroscopic power source directly drives the front end load; at this time, clutch CL301 is loose;

10 F12: primary side gyroscopic power source drives the front end load and the rear differential gear input motive force at the same time; at this time, clutch CL301 is close;

15 F13: primary side gyroscopic power source only drives the rear end differential gear input power; at this time, clutch CL301 is loose; and the front end operative mechanism interface M302 is idle to the front end load gear;

20 F14: magnetic coupling driving device M301 and primary side gyroscopic power source drives at the same time all the load; at this time, clutch CL301 is close;

F15: magnetic coupling driving device M301 drives the rear end differential gear output load; at this time, clutch CL301 is loose;

25 F16: magnetic coupling driving device M301 drives the front end load and differential gear output load at the same time all the load; at this time, clutch CL301 is close;

30

FIG 3 is another embodiment which has a changed design as follows:

--when original two load ends of the rear end differential gear is output at only one end, the device
5 M301 can be coupled to one of the load ends of the differential gear box, and led to the load from another end, at this time the operation of the system is the same as illustrated in FIG2, and in addition to using the reverse moment of output current from self-
10 generating power as a damping, device 301 can also use a brake B301 on a magnetic coupling driving device for controlling its turning part to lock or control the gyroscopic output, and the clutch between central shaft S301 and rear end load can be omitted. The device
15 M301 and brake B301 are controlled by CCU302, when driving direction is reverse, it can be regarded as the front end load being replaced by the rear end load;
FIG 3A is an embodiment of the differential coupling and compounding power system and structure of electric
20 transmission storing type which is output from rear shaft and one side.
FIG 4 is another embodiment of the differential coupling and compounding power system of electric transmission storing type which is in cascade load.
25 Its primary side gyroscopic power source output drives the front end load and then is output to one of the two end shafts of magnetic coupling driving device, and the other end of the device is directly conducted to rear end load or through a transmission element, or through
30 a differential gear to a load needed for

differentiality (e.g. double unit rear wheels).

The embodiment in FIG 4 comprising:

- 5 --primary side gyroscopic power unit 400: it is an
internal fire engine;
- front end load W401: it is a two unit driven front
wheel and a ground driving damp, or other load;
- central gear box and transmission device and
10 operation mechanism interface of front load M402
(including automatical or manual gearing control system
of traditional front wheel transmission): except for
the driving front end load, it has a backward extending
unit or more than a unit of central shafts S401 which
15 has an output rotating number of the front end load
with an adequate rotating speed rate, (similar to the
rear wheel transmission central shaft of the backward
extending four wheel transmission), its traits are a
controllable clutch B401 is fitted between the central
20 shaft and the fixed case so as to be controlled by
CCU401;
- magnetic coupling driving device M401: it is a double
end shaft structure including a turnable magnetic field
and a turnable rotor, the turnable magnetic field
25 and the turnable rotor are respectively connected with
a transmission central shaft and an input shaft of rear
end differential gear box 401 so as to drive
differential load Wload on both sides; a clutch CL402
controlled by CCU401 is fitted between the turnable
30 magnetic field and the turnable rotor, and it directly

enables these two to have a mechanic lock at the same time; this device has a mechanic trait that the smaller the load the higher the speed and that a mechanic trait of series wound, or auxiliary multiple wound auxiliary dynamo, or a current value controlled A.C. or D. C. brush or brushless dynamo so as to have a function of a control value increasing according to the load, so that the following F14 function and the primary side gyroscopic power source are driven together to increase the function of torsional moment; it receives the control of the control order of CCU401 so that it can control the magnetic coupling driving device for a motor or a dynamo; and the CCU401 outputs its control order to drive circuit device D401 according to its control order and the operative state of the primary side gyroscopic power unit 400.

The system has the following functions in addition to the above-mentioned function:

20 F21: primary side gyroscopic power source drives the front end load; at this time, magnetic coupling driving device M401 is at break;

F22: primary side gyroscopic power source only drives the rear end load; at this time magnetic coupling driving device M401 is in a state of

25 generating power or clutch CL402 is close, and front end control interface M402 is idle ;

F23: primary side gyroscopic power source drives the front end and the rear end load at the same time; at

30 this time, magnetic coupling driving device M401 has

power and acts as a motor;

F24: primary side gyroscopic power source only drives
the rear end load; at this time, magnetic coupling
driving device M401 has power and acts as a motor; and
5 brake B401 is close;

F25: magnetic coupling driving device M401 drives at
the same time both the front and the rear end load; at
this time, magnetic coupling driving device M401 has
10 power and acts as a motor.

FIG 5 is an embodiment of the differential coupling and
compounding power system of electric transmission
storing type which is formed by means of series dual
15 differential gears. It has a first differential gear
moved by a input shaft and a second differential gear
moved by magnetic coupling driving device M401 and it
drives according to the total and difference between
these two gears, and drives two output wheel and output
20 shaft to issue differential output; it is comprised of:

- primary side gyroscopic power source P501: it is an
internal fire engine or other gyroscopic power source;
- input shaft S501: It provides a primary side
25 gyroscopic power source and moves a small gear 502 to
move a big gear 503;
- big gear 503: it is driven by a small gear 502 and it
can move the frame 530 of the differential gear
504, 505 of the first differential gear system, and
30 further move the differential gear 504, 505, and it

can drive together with the second differential gear 506 according to the total and difference between these two gears;

5 --the second differential gear 506: It combines the second input big gear 507 to match with the second input small gear 508, the second input small gear 508 receives the positive or negative rotating driving of the magnetic coupling driving device H509, or on the contrary, the input small gear 508 can move the
10 magnetic coupling driving device H509 to act as a generator;

--differential gear 510: It uses the frame 531 to move the differential gears 511, 512 of the second differential gear unit and then move the output
15 differential gears 513, 514 and further move two output shaft S515, S516 so as to act differential output;

-- the magnetic coupling driving device H509: It has a trait that the smaller the load the higher the speed, a mechanic trait of series wound, or auxiliary multiple
20 wound auxiliary dynamo, or a current value controlled (including constant current control) A.C. or D. C. brush or brushless dynamo so as to have a function of an increase of the torsional moment, it has a brake CL519 for an operation of locking or loosening;

25 --Brake B518: it is provided at the static housing of the system and at the input end of the primary side gyroscopic power source, in the example, it is fitted between big gear 503 and the housing 500;

--driving circuit D518: It can receive the order of
30 CCU520 to control magnetic coupling driving device to

act as a generator or a motor, or by means of
controlling the output current value (including preset
current) between the battery BT521 and the magnetic
coupling driving device M509 to help drive the
5 value-increasing torsional moment for the load, or by
means of controlling the magnetic coupling driving
device to charge current for the battery BT521 to make
magnetic coupling driving device BT521 have a damping;
--central control unit CCU520: it is comprised of a
10 dynamo and a solid electronic element, it is a
reference to a load state (e.g. oil valve state) and
a driving state (e.g. speed) of an operative order and
primary side gyroscopic power source so as to control
magnetic coupling driving device as to a generator, a
15 motor, or a break idle state;

And CCU520 is secured to or loose to the clutch CL519
and brake B518 by a control, the situation of the
control can be illustrated as follows:

20

(1): magnetic coupling driving device drives the load
or generates power to reproduce braking; at this time,
brake B518 is close;

(2): primary side gyroscopic power source drives the
25 load; at this time, clutch CL301 is close;

(3): primary side gyroscopic power source and the
magnetic coupling driving device both drive at the
same time all the load; at this time, brake B518
and clutch CL519 are loose;

30

FIG 6 is an embodiment of the differential coupling and compounding power system of electric transmission storing type which can drive an engine power system through a load control value-gaining torsional force of an auxiliary dynamo. This embodiment has a trait that the smaller the load the higher the speed, a mechanic trait of series wound, or auxiliary multiple wound auxiliary dynamo, or a current value controlled (including constant current control) A.C. or D. C. brush or brushless dynamo so as to have a function of a control value increasing according to the load to have the function of increasing the torsional moment ;

This system is comprised of the following:

- gyroscopic power source: a power source from engine or other gyroscopic power source, it has a clutch between the input shaft S601 and itself, or other transmission gear which should be in idle state;
- input shaft S601: It can receive the driving from engine or other gyroscopic power source, and its small gear 602 is matched with the big gear 603;
- input big gear 603: It can connect and move two units of differential gear units 605, 615 and is matched with the second small gear 604 so as to help dynamo M610 to act power coupling;
- left side differential gear 606: It provides a drive left output shaft S608;
- right side differential gear 606: It provides a drive right output shaft S609;
- auxiliary dynamo M610: It can receive the driving

fr the driver D611, the driver D611 is controlled by
CCU620, it controls the following functions according
to the driving operative situation (e.g. turning
speed, oil exhausted, and order value of the total
5 driving need) of the primary side :

- (1) battery BT612 provides the power for dynamo output;
- (2) used as a generator to charge the battery;
- (3) idle;

10 The auxiliary dynamo has a trait that the smaller
the load the higher the speed, a mechanic trait of
series wound, or auxiliary multiple wound auxiliary
dynamo, or a current value controlled (including
constant current control) A.C. or D. C. brush or
15 brushless dynamo so as to have a function of a
control value increasing according to the load to have
the function of increasing the torsional moment;

--driver for dynamo driving D611: the driver D611 is
20 controlled by CCU620 to control the control auxiliary
dynamo, it is composed of a dynamo element or a solid
element or both of them;

--CCU620: it sends the relative orders to the driver
25 D611 according to the total system output operative
orders and according to the primary side operative
situation (e.g. turning speed, oil exhausted, and order
value of the total driving need);

--battery BT612: it is a battery which can charge or
30 discharge power, it can be chosen from any kinds of

charge/discharge secondary battery or fuel battery;

By means of the above system, it becomes a useful, better and a more effective compound power system.

5 In practical use, this dynamo can be coupled to the input big gear of the differential gear or coupled more adjacent to the engine primary side, and by means of the transmission element and primary side gyroscopic shaft coupling, it can operate as follows:

10 --primary side is open (e.t. between input shaft, the clutch is loose or the operative transmission gear is idle), and uses power from battery to drive auxiliary dynamo for the motor driving load;

--when primary side gyroscopic is input, it uses
15 auxiliary dynamo to control the current and to adjust the auxiliary torsional moment of the primary side;

--auxiliary dynamo is open and is driven and operated by the primary side;

In addition, it can have the following functions:

20 --when primary side is in light load input, or in need of reducing speed, the auxiliary dynamo is in a state of generating power to charge the battery and produce a damping.

If the rear end load side of this system is driven
25 by an output shaft, as shown in FIG 6A, an embodiment of the system in FIG 6 of which its rear end load side is provided for driving a sole output shaft, it is different from the FIG 6 because the input big gear 603 is directly connected to the input shaft S601 and the
30 primary differential gear is omitted, and the auxiliary

dynamo M610 still uses the second small gear 604 to match with the big gear 603.

In addition, as shown in FIG 7, the system can use engine primary side gear to match with the auxiliary
5 dynamo gear to form a multiple power system of electric power storing differential coupling. this system is in series and there provided a clutch CL705 between engine P702 and output big gear 704; if the output end of the engine and the auxiliary dynamo have
10 a clutch CL706 (or the transmission box has a idle clutch), and if the motive power of the output shaft S707 is cut off, the auxiliary dynamo can start the engine or the engine can start the generator to produce power for charging the battery; it has a dynamo driving
15 driver D711 controlled by the order of the CCU720 to control the auxiliary dynamo. it consists of dynamo element or solid element or both of them. it also has a CCU620 which sends the relative orders to the driver D611 according to the total system output
20 operative orders and according to the primary side operative situation (e.g. turning speed, oil exhausted, and order value of the total driving need); it also has a battery BT612 which can charge or discharge power. it can be chosen from any kinds of
25 charge/discharge secondary battery or fuel battery; this system has the following traits:
--auxiliary dynamo M701 has a trait that the smaller the load the higher the speed, a mechanic trait of series wound, or auxiliary multiple wound auxiliary
30 dynamo, or a current value controlled (including

constant current control) A.C. or D. C. brush or
brushless dynamo so as to have a function of a
control value increasing according to the load to have
the function of increasing the torsional moment, it
5 also uses the small gear 703 to mesh with the big gear
704.

The system, differential coupling and compounding
power system of electric transmission storing type,
10 can be applied to car wheels, ships, or other solid
multiple driving power; the above-mentioned
embodiments in FIG 1-7 are to illustrate all kinds of
applications of the invention, the differential
coupling and compounding power system of electric
15 transmission storing type; but in practical use,
the readers can choose its circumferential parts for
your need.

20

25

30

WHAT IS CLAIMED IS:

1. The differential coupling and compounding power system of electric transmission storing type comprising:
 - Primary side gyroscopic power source P101 : it is usually an internal fire engine, but in practical use, the external combustion engine, wind and water power, and other gyroscopic power source can also be used;
 - the primary side gyroscopic power source has a brake B101 for the need of operation system to lock the primary side gyroscopic output shaft; the primary side gyroscopic power source also has a speed or power controller PC101 (e.g. it is used as the oil controller when the internal fire engine is used as a primary side gyroscopic power source) so as to receive manual or the CCU101 control;
 - Differential gear 100: it includes the sun gear 101 of the magnetic coupling driving device; it is composed of the outer ring gear 102 of the primary side gyroscopic power source and the loose star gear 103 for the differential output; the loose star gear has an output coaxial shaft S104;
 - Magnetic coupling driving device M101: it has rotors and magnetic field and in system operation it can be used as a motor when power is input, or as a generator to charge a battery when the inertia of the system is turned into electric power, or by means of the distribution of the differential gear it can receive

the driving motive force of part of the primary side
gyroscopic power source and can be used as a
generator to charge a battery. It and the system output
load are together formed into a load of the primary
5 side gyroscopic power source. By means of adjusting
the power for the battery, it can adjust the turning
speed difference between the system output load and the
primary side gyroscopic power source, especially when
the power source is an engine; in this way, the engine
10 can operate better and keep to control the turning
speed of the load driving; the magnetic coupling device
M101 provides a damping to drive the engine directly,
it can use the magnetic coupling driving device as a
generator to output a constant current which provides a
15 reproduced power brake damp, or add a brake device B102
between the gyroscopic field of the magnetic coupling
driving device and the turnable rotors so as to provide
a mechanic brake; the magnetic coupling driving device
and the structure of turnable rotors are comprised of
20 generator and dynamo, which consist of constant magnetic
or coil exciting fields and rotors of constant magnetic
iron or slide ring conductive coil rotors, or consists
of series wound, shunt wound, or multiple wound, or
synchronizing brushless dynamo or stepping dynamo;
25
-- control element D101 of magnetic coupling driving
device: It can receive orders from CCU101 to supply
power to control charge or discharge the voltage and
current between the magnetic coupling driving device
30 and battery and to control the armature constant current

output and the magnetic coupling driving device itself provides a magnetic brake damping:

- 5 -- Battery BT101: all kinds of battery which can charge and discharge power;
- Output shaft S103: a gyroscopic output end of the system for a driving load, when necessary a brake B103 can be attached on it, and in the following system operation, the system load can be used as a damping or
10 further used together with a brake B103 as a damping supplier;
- CCU101: It consists of solid circuit or dynamo elements to receive manual or signal control order so as to control the system and act out the whole or part
15 of the function as following Table 1:

The functions in Table I are as follows:

- F1-A, F1-B, F1-C, F1-D: a system operation for load lower speed output driving;
- 20 F2: a system operation for battery power input magnetic driving device for motor operation to drive load;
- F3: a system operation for driving engine and battery power input coupling driving device for motor operation to reach the output turing speed and power increasing
25 as a big power output;
- F4: a system operation for load side mechanic motive power feedback driving magnetic coupling driving device as a generator for receiving power back into battery;
- F5: a system operation for engine driving magnetic
30 coupling driving device for generator charging the

battery; this function can further control the charging time automatically in advance;

F6: a motor operation for a magnetic coupling driving device by means of battery power to drive a motor and

5 start an engine.

10

15

20

25

30

Element \ Function		B101	B102	B103	P101	(H101) G/H	BT101
F1-A	B102 closed for controlling engine oil valve from low speed control driven to medium speed.	OFF	ON	OFF	0-HAX	STOP	STOP
F1-B	H101 and engine oil valve controlled from low speed to medium speed and charging at the same time.	OFF	OFF	OFF	0-HAX	GEN.	CHARGE
F1-C	H101 controlled by the engine constant speed for changing the load output power of the current charged to the battery.	OFF	OFF	OFF	CONSTANT SPEED	GEN.	CHARGE
F1-D	H101 controlling output speed by a short cut.	OFF	OFF	OFF	CONSTANT SPEED	GEN.	STOP
F2	Battery power drives H101 to transmit and output forward and backward.	ON	OFF	OFF	STOP	MOTOR	DIS-CHARGE
F3	H101 controlled and the engine rotated to add speed and power of the motor to each other.	OFF	OFF	OFF	HAX	MOTOR	DIS-CHARGE
F4	H101 as a generator for receiving motive force and turning it into power for charging the battery.	OFF	OFF	OFF	SLOW	GEN.	CHARGE
		ON	OFF	OFF	STOP	GEN.	CHARGE
F5	System charged automatically (stop at a set time)	OFF	OFF	ON	0-HAX	GEN.	CHARGE
F6	H101 as an engine to start motor	OFF	OFF	ON	START		

Note : (1) Charge of F1-B is distribute for current according to the load.

(2) H101 a magnetic coupling driving device.

(3) P101 and H101 series is a primary side gyroscopic power source; e.g. engine .

(4) BT101 a battery.

2. As claimed in Claim 1, the differential coupling and compounding power system of electric transmission storing type, wherein the system is directly connected to an input shaft of a magnetic coupling driving device through a gyroscopic output shaft of an internal fire engine or through a transmission gear, belt, chain, or coupler; the magnetic coupling driving device is a dual end shaft of which either end is respectively connected to a turnable magnetic field and turnable rotors so as to be controlled by a control device and to generate the driving function of a motor when current is input; or it is used to generate power and output power and produce the transmission coupling function through coupling torsional moment of output current, or to start an engine and to brake the reproducing power, when the engine is solely rotated to output driving load or rotate with the engine to output driving load; for example, when engine is solely driven, it can be used as a transmittable coupling device, and there provided a magnetic or liquid or mechanic driving clutch between gyroscopic magnetic field and turnable rotors to act out a coupling between magnetic field and rotors so as to transmit directly and to control the speed by controlling the engine when it is closed. The main structure of the FIG 2 can be illustrated as follows:

- internal fire engine P201 is driven by the materials such as gasoline, diesel, alcohol, gas, and hydrogen;
- primary output shaft of internal fire engine S202 ;
- coupler 203: it can be a board coupler, universal joint, or other conventional shaft-to-shaft or

shaft-to-coaxial gyroscopic coupling devices:

- turnable driving field 204 of the magnetic coupling driving device M201: a fixed mechanic structure which has a bearing and can bear this structure by means of
- 5 coupler 203 directly coupled to the internal fire engine primary gyroscopic output shaft, or by means of the transmission devices, such as gear, belt, and chain so as to receive the driving of the engine output shaft;
- 10 -- constant magnetic exciting coil 205: it is controlled by the CCU221, and is conducted to an exciting magnetic current which can control its polarity and current volume input through a conductive ring, or futher, it consists of A.C. or D. C. converter
- 15 dynamo of constant magnetic iron field, or brushless synchronical or differential dynamo.
- insulated sleeve of armature conductive brush seat 206;
- cap of armature conductive brush seat 207;
- 20 --armature conductive brush seat 20;
- armature conductive brush 209;
- gyroscopic armature exchanger 210: if the magnetic coupling device is a converter dynamo for rotors to change phase and for conduction, its structure can be
- 25 cylindric or board, and its brush and brush seat are fixed at its outside or side;
- turning rotor 211: it can be a converter armature and a cylindrical D.C. armature having a conventional coil and tooth iron core, or a printing armature rotor
- 30 structure, or a cup armature rotor structure, or a iron

coreless armature rotor structure, or other A.C. or D.C.dynamo structure, if it is a brushless one, it contains constant magnetic iron;

--output shaft of armature rotor S212;

5 --conductive slip ring insulated sleeve 213;

--armature and magnetic field output/input conductive ring 214: respectively connected to armature output/input conductive brush seat and connected to both ends of the magnetic field exciting magnetic coil;

10 if it is a brushless one, the brush and brush seat can be omitted when necessary;

--coupled to brush 215 of conductive ring;

--coupled to brush seat 216 of conductive ring;

--coupled to conductive ring brush insulated seat 217;

15 --internal fire engine primary output shaft magnetic brake B101: it connects with the output shaft through keys or pins and has a braking function when it has power; it can be replaced by a mechanic braking device in a manual, hydrostatic, air or oil pressure way of

20 operation, and it can be used when a driving is necessary;

--output side magnetic brake device B103 of the magnetic coupling driving device: it connects with the output shaft through keys or pins and has a braking function

25 when it has power; it can be replaced by a mechanic braking device in a manual, hydrostatic, air or oil pressure way of operation, and it can be used when a driving is necessary;

--battery BT220: it can also choose any kinds of

30 charging and discharging battery or fuel battery;

--engine speed feedback speed-inspecting generator TG1:
it is devised when necessary, and it is coupled to
primary output shaft and can produce an analog or
digital signal for the engine speed by means of the
5 electric or magnetic effect, and a transmission device
which has a positive contrast with the engine speed can
be selected to replace its coupling position;
-- output shaft speed generator TG2: it is devised when
necessary, and it is coupled to output side armature
10 rotor output shaft or to a driving gear at a position
where the rotating speed of the output shaft is in
positive contrast with its driving gear, and can
produce an analog or digital signal for the engine
speed by means of the electric or magnetic effect;
15 --Central control unit CCU221: it is comprised of
conventional switch, potential device, photoelectric
device, solidor dynamo element, micro-computer,
including control element and driving interface unit;
--clutch device CL222 between gyroscopic field
20 of magnetic coupling driving device M201 and turnable
rotor: It is controlled by the magnetic, fluid, or
mechanic force, when OFF is open, magnetic field and
rotor will rotate to each other, when On is closed,
magnetic field and rotor will be directly locked and
25 transmitted.

Other circumferential device, such as magnetic
oil valve adjustment driving device, which can be
devised when necessary; its engine rotates in constant
30 speed by means of the feedback of TG1 so as to adjust

the driving for the oil valve; auxiliary generator can be a D.C. or A.C generator by means of a converter, it also can receive the driving of an engine to produce power through belt, or other transmission devices;
5 voltage converter automaticall controls the generator in different engine speed to produce a stable charging voltage for charging a battery.

10

15

20

25

30

Element \ Function		B101	CL222	B103	P201	(H201) G/H	BT220
F1-A	CL222 closed for controlling engine oil valve from low speed control driven to medium speed.	OFF	ON	OFF	0-MAX	STOP	STOP
F1-B	H201 and engine oil valve controlled from low speed to medium speed and charging at the same time.	OFF	OFF	OFF	0-MAX	GEN.	CHARGE
F1-C	H201 controlled by the engine constant speed for changing the load output power of the current charged to the battery.	OFF	OFF	OFF	CONSTANT SPEED	GEN.	CHARGE
F1-D	H201 controlling output speed by a short cut.	OFF	OFF	OFF	CONSTANT SPEED	GEN.	STOP
F2	Battery power drives H201 to transmit and output forward and backward.	ON	OFF	OFF	STOP	MOTOR	DIS-CHARGE
F3	H201 controlled and the engine rotated to add speed and power of the motor to each other.	OFF	OFF	OFF	MAX	MOTOR	DIS-CHARGE
F4	H201 as a generator for receiving motive force and turning it into power for charging the battery.	OFF	OFF	OFF	SLOW	GEN.	CHARGE
		ON	OFF	OFF	STOP	GEN.	CHARGE
F5	System charged automatically (stop at a set time)	OFF	OFF	ON	0-MAX	GEN.	CHARGE
F6	H201 as an engine to start motor	OFF	OFF	ON	START		

Note: (1) Charge of F1-B is distribute for current according to the load.

(2) H201 a magnetic coupling driving device.

(3) P201 and H201 series is a primary side gyroscopic power source; e. g. engine.

(4) BT220 a battery.

3. As claimed in Claim 1, the differential coupling and compounding power system of electric transmission storing type, wherein

- 5 --primary side gyroscopic power unit 300: it is an internal fire engine;
--front end load W301: it is a two units of front wheel driven and ground driving damping load or other load;
--central gear box and transmission device and
10 operation mechanism interface of front load W302 (including automatical or manual gearing control system of traditional front wheel transmission): except for the driving front end load, it has a backward extending unit or more than a unit of central shafts S301 which
15 has an output rotating number of the front end load with an adequate rotating speed rate, (similar to the rear wheel transmission central shaft of the backward extending four wheel transmission), its traits are a controllable clutch CL301 is fitted between the central
20 shaft and the rear end differential gear box so as to transmit the primary side gyroscopic motive force to the rear differential speed gear box, or to transmit the motive force from the rear end differential gear box to the front end load, or to make the two motive
25 forces transmitted to each other, or its clutch is a manual, fluid, mechanic, controllable one, or an electrically controlled magnetic one;
--rear end differential gear box 301: a small gear 301 receives the driving of a clutch and moves a matched
30 big gear 302, which is connected with two differential

gears 323,324, respectively driving two output gears 303,304 and two loads W310, W311 moved by two output shafts; big gear 302 is matched with two small gears for two power sources, wherein front end small gear 301
5 for clutch CL301 is led to primary gyroscopic power unit, a small gear 305 coupled to rear end is led to magnetic coupling driving device M301;
--magnetic coupling driving device M301: a driving motor comprised of A.C. or D.C. brush or brushless
10 dynamo armature for a driving load provided by the small gear 305 driven and matched by the big gear 302 of a differential gear system, if the motor chosen can change the mechanic feedback power into electric power as a kind of reproduced power, it can produce a damping
15 by means of the reproduced power; this device M301 has a trait that the smaller the load the higher the speed, a mechanic trait of series wound, or auxiliary multiple wound auxiliary dynamo, or a current value controlled (including constant current control) A.C. or D. C.
20 brush or brushless dynamo so as to have a function of a control value increasing according to the load, so that the following F14 function and the primary side gyroscopic power source are driven together to increase the torsional moment for an auxiliary driving;
25 --central control unit CCU301: it is comprised of a dynamo and a solid electronic element, it is a reference to a load state (e.g. oil valve state) and a driving state (e.g. speed) of an operative order and primary side gyroscopic power source so as to control
30 magnetic coupling driving device as to a generator, a

motor, or a break idle state, and CCU301 is secured to or loose to the clutch CL301 by a control.

The system has the following functions in addition to the above-mentioned function:

- 5 F11: primary side gyroscopic power source directly drives the front end load; at this time, clutch CL301 is loose;
- F12: primary side gyroscopic power source drives the front end load and the rear differential gear input
10 motive force at the same time; at this time, clutch CL301 is close;
- F13: primary side gyroscopic power source only drives the rear end differential gear input power; at this time, clutch CL301 is loose; and the front end
15 operative mechanism interface M302 is idle to the front end load gear;
- F14: magnetic coupling driving device M301 and primary side gyroscopic power source drives at the same time all the load; at this time, clutch CL301 is close;
- 20 F15: magnetic coupling driving device M301 drives the rear end differential gear output load; at this time, clutch CL301 is loose;
- F16: magnetic coupling driving device M301 drives the
25 front end load and differential gear output load at the same time all the load; at this time, clutch CL301 is close;

- when original two load ends of the rear end
30 differential gear is output at only one end, the device

M301 can be coupled to one of the load ends of the differential gear box, and led to the load from another end, at this time the operation of the system is the same as illustrated in FIG2, and in addition to using
5 the reverse moment of output current from self-generating power as a damping, device 301 can also use a brake B301 on a magnetic coupling driving device for controlling its turning part to lock or control the gyroscopic output, and the clutch between central shaft
10 S301 and rear end load can be omitted. The device M301 and brake B301 are controlled by CCU302, when driving direction is reverse, it can be regarded as the front end load being replaced by the rear end load;

15 4. As claimed in Claim 1, the differential coupling and compounding power system of electric transmission storing type, wherein

--primary side gyroscopic power unit 400: it is an internal fire engine;

20 --front end load W401: it is a two unit driven front wheel and a ground driving damp, or other load;

--central gear box and transmission device and operation mechanism interface of front load M402 (including automatical or manual gearing control system

25 of traditional front wheel transmission): except for the driving front end load, it has a backward extending unit or more than a unit of central shafts S401 which has an output rotating number of the front end load with an adequate rotating speed rate, (similar to the
30 rear wheel transmission central shaft of the backward

entending four wheel transmission), its traits are a
controlable clutch B401 is fitted between the central
shaft and the fixed case so as to be controlled by
CCU401;

5 --magnetic coupling driving device M401: it is a double
end shaft structure including a turnable magnetic field
and a turnable rotor, the turnable magnetic field
and the turnable rotor are respectively connected with
a transmission central shaft and an input shaft of rear
10 end differential gear box 401 so as to drive
differential load Wload on both sides; a clutch CL402
controlled by CCU401 is fitted between the turnable
magnetic field and the turnable rotor, and it directly
enables these two to have a mechanic lock at the same
15 time; this device has a mechanic trait that the smaller
the load the higher the speed and that a mechanic trait
of series wound, or auxiliary multiple wound auxiliary
dynamo, or a current value controlled A.C. or D. C.
brush or brushless dynamo so as to have a function of a
20 control value increasing according to the load, so that
the following F14 function and the primary side
gyroscopic power source are driven together to increase
the function of torsional moment; it receives the
control of the control order of CCU401 so that it can
25 control the magnetic coupling driving device for a
motor or a dynamo; and the CCU401 outputs its control
order to drive circuit device D401 according to its
control order and the operative state of the primary
side gyroscopic power unit 400.

30

The system has the following functions in addition to the above-mentioned function:

- 5 F21: primary side gyroscopic power source drives the front end load; at this time, magnetic coupling driving device M401 is at break;
- F22: primary side gyroscopic power source only drives the rear end load; at this time magnetic coupling driving device M401 is in a state of generating power or clutch CL402 is close, and front
10 end control interface M402 is idle ;
- F23: primary side gyroscopic power source drives the front end and the rear end load at the same time; at this time, magnetic coupling driving device M401 has power and acts as a motor;
- 15 F24: primary side gyroscopic power source only drives the rear end load; at this time, magnetic coupling driving device M401 has power and acts as a motor; and brake B401 is close;
- 20 F25: magnetic coupling driving device M401 drives at the same time both the front and the rear end load; at this time, magnetic coupling driving device M401 has power and acts as a motor.
- 25 5. As claimed in Claim 1, the differential coupling and compounding power system of electric transmission storing type, wherein a first differential gear moved by a input shaft and a second differential gear moved by magnetic coupling driving device M401 and it
30 drives according to the total and difference between

these two gears, and drives two output wheel and output shaft to issue differential output; it is comprised of:

- 5 -- primary side gyroscopic power source P501: it is an internal fire engine or other gyroscopic power source;
- input shaft S501: It provides a primary side gyroscopic power source and moves a small gear 502 to move a big gear 503;
- 10 --big gear 503: it is driven by a small gear 502 and it can move the frame 530 of the differential gear 504, 505 of the first differential gear system, and further move the differential gear 504, 505, and it can drive together with the second differential gear 506 according to the total and difference between these
- 15 two gears;
- the second differential gear 506: It combines the second input big gear 507 to match with the second input small gear 508, the second input small gear 508 receives the positive or negative rotating driving of
- 20 the magnetic coupling driving device M509, or on the contrary, the input small gear 508 can move the magnetic coupling driving device M509 to act as a generator;
- differential gear 510: It uses the frame 531 to move
- 25 the differential gears 511, 512 of the second differential gear unit and then move the output differential gears 513, 514 and further move two output shaft S515, S516 so as to act differential output;
- the magnetic coupling driving device M509: It has
- 30 a trait that the smaller the load the higher the speed,

a mechanic trait of series wound, or auxiliary multiple wound auxiliary dynamo, or a current value controlled (including constant current control) A.C. or D. C. brush or brushless dynamo so as to have a function of an increase of the torsional moment, it has a brake CL519 for an operation of locking or loosening;
5 --Brake B518: it is provided at the static housing of the system and at the input end of the primary side gyroscopic power source, in the example, it is fitted
10 between big gear 503 and the housing 500;
--driving circuit D518: It can receive the order of CCU520 to control magnetic coupling driving device to act as a generator or a motor, or by means of controlling the output current value (including preset
15 current) between the battery BT521 and the magnetic coupling driving device M509 to help drive the value-increasing torsional moment for the load, or by means of controlling the magnetic coupling driving device to charge current for the battery BT521 to make
20 magnetic coupling driving device BT521 have a damping;
--central control unit CCU520: it is comprised of a dynamo and a solid electronic element, it is a reference to a load state (e.g. oil valve state) and a driving state (e.g. speed) of an operative order and
25 primary side gyroscopic power source so as to control magnetic coupling driving device as to a generator, a motor, or a break idle state;

And CCU520 is secured to or loose to the clutch CL519
30 and brake B518 by a control, the situation of the

control can be illustrated as follows:

(1): magnetic coupling driving device drives the load
or generates power to reproduce braking; at this time,
5 brake B518 is close;

(2): primary side gyroscopic power source drives the
load; at this time, clutch CL301 is close;

(3): primary side gyroscopic power source and the
magnetic coupling driving device both drive at the
10 same time all the load; at this time, brake B518
and clutch CL519 are loose;

6. As claimed in Claim 1, the differential coupling and
compounding power system of electric transmission
15 storing type, wherein the system has a trait that
the smaller the load the higher the speed, a mechanic
trait of series wound, or auxiliary multiple wound
auxiliary dynamo, or a current value controlled
(including constant current control) A.C. or D. C.
20 brush or brushless dynamo so as to have a function of a
control value increasing according to the load to have
the function of increasing the torsional moment ;

This system is comprised of the following:
25 --gyroscopic power source: a power source from engine
or other gyroscopic power source, it has a clutch
between the input shaft S601 and itself, or other
transmission gear which should be in idle state;
--input shaft S601: It can receive the driving from
30 engine or other gyroscopic power source, and its small

gear 602 is matched with the big gear 603;
--input big gear 603: It can connect and move two units
of differential gear units 605, 615 and is matched with
the second small gear 604 so as to help dynamo M610 to
5 act power coupling;
--left side differential gear 606: It provides a drive
left output shaft S608;
--right side differential gear 606: It provides a drive
right output shaft S609;
10 --auxiliary dynamo M610: It can receive the driving
from the driver D611, the driver D611 is controlled by
CCU620, it controls the following functions according
to the driving operative situation (e.g. turning
speed, oil exhausted, and order value of the total
15 driving need) of the primary side :

- (1) battery BT612 provides the power for dynamo output;
- (2) used as a generator to charge the battery;
- (3) idle;

20 The auxiliary dynamo has a trait that the smaller
the load the higher the speed, a mechanic trait of
series wound, or auxiliary multiple wound auxiliary
dynamo, or a current value controlled (including
constant current control) A.C. or D. C. brush or
25 brushless dynamo so as to have a function of a
control value increasing according to the load to have
the function of increasing the torsional moment;

--driver for dynamo driving D611: the driver D611 is
30 controlled by CCU620 to control the control auxiliary

element or both of them;

- 5 --CCU620: it sends the relative orders to the driver
D611 according to the total system output operative
orders and according to the primary side operative
situation (e.g. turning speed, oil exhausted, and order
value of the total driving need);
- 10 --battery BT612: it is a battery which can charge or
discharge power, it can be chosen from any kinds of
charge/discharge secondary battery or fuel battery;

By means of the above system, it becomes a useful,
better and a more effective compound power system.

- 15 In practical use, this dynamo can be coupled to the
input big gear of the differential gear or coupled
more adjacent to the engine primary side, and by
means of the transmission element and primary side
gyroscopic shaft coupling, it can operate as follows:
- 20 --primary side is open (e.t. between input shaft, the
clutch is loose or the operative transmission gear is
idle), and uses power from battery to drive auxiliary
dynamo for the motor driving load;
- when primary side gyroscopic is input, it uses
- 25 auxiliary dynamo to control the current and to adjust
the auxiliary torsional moment of the primary side;
- auxiliary dynamo is open and is driven and operated
by the primary side;
- In addition, it can have the following functions:
- 30 --when primary side is in light load input, or in need

of reducing speed, the auxiliary dynamo is in a state of generating power to charge the battery and produce a damping.

5 If the rear end load side of this system is driven by an output shaft, as shown in FIG 6A, an embodiment of the system in FIG 6 of which its rear end load side is provided for driving a sole output shaft, it is different from the FIG 6 because the input big gear 603
10 is directly connected to the input shaft S601 and the primary differential gear is omitted, and the auxiliary dynamo M610 still uses the second small gear 604 to mesh with the big gear 603.

15 7. As claimed in Claim 1, the differential coupling and compounding power system of electric transmission storing type, wherein the system can use engine primary side gear to mesh with the auxiliary dynamo gear to form a multiple power system of electric power storing
20 differential coupling, this system is in series and there provided a clutch CL705 between engine P702 and output big gear 704; if the output end of the engine and the auxiliary dynamo have a clutch CL706 (or the transmission box has a idle clutch), and if the motive
25 power of the output shaft S707 is cut off, the auxiliary dynamo can start the engine or the engine can start the generator to produce power for charging the battery; it has a dynamo driving driver D711 controlled by the order of the CCU720 to control the
30 auxiliary dynamo. it consists of dynamo element or

solid element or both of them, it also has a CCU620
which sends the relative orders to the driver D611
according to the total system output operative orders
and according to the primary side operative situation
5 (e.g. turning speed, oil exhausted, and order value of
the total driving need); it also has a battery BT612
which can charge or discharge power, it can be chosen
from any kinds of charge/discharge secondary battery or
fuel battery; this system has the following traits:
10 --auxiliary dynamo H701 has a trait that the smaller
the load the higher the speed, a mechanic trait of
series wound, or auxiliary multiple wound auxiliary
dynamo, or a current value controlled (including
constant current control) A.C. or D. C. brush or
15 brushless dynamo so as to have a function of a
control value increasing according to the load to have
the function of increasing the torsional moment, it
also uses the small gear 703 to match with the big gear
704.

20

25

30

Patents Act 1977**Examination report to the Comptroller under
Section 17 (The Search Report)**

Application number

GB 9303513.7

-56-

Relevant Technical fields(i) UK CI (Edition L) B7H (HDE) F1Q (QCA, QCX, QDD,
QEA)

(ii) Int CI (Edition)

Search Examiner

C B VOSPER

Databases (see over)

(i) UK Patent Office

(ii)

Date of Search

24 MAY 1993

Documents considered relevant following a search in respect of claims 1 AT LEAST (SEE LETTER)

Category (see over)	Identity of document and relevant passages	Relevant to claim(s)
A	GB 2235952 A (NOEL) whole document	1 at least
A	GB 1440484 (ROBERT BOSCH) whole document	1 at least
A	GB 1280870 (ALLMANNA) page 2 lines 39-65	1 at least
A	GB 644096 (SERVO-) page 2 lines 41 et seq	1 at least
A	GB 476729 (JUNKERS) see Figures 8 and 9	1 at least
A	EP 0233079 A2 (ISUZU) whole document	1 at least

Category	Identity of document and relevant passages -57-	Relevant claim(s)

Categories of documents

X: Document indicating lack of novelty or of inventive step.

Y: Document indicating lack of inventive step if combined with one or more other documents of the same category.

A: Document Indicating technological background and/or state of the art.

P: Document published on or after the declared priority date but before the filing date of the present application.

E: Patent document published on or after, but with priority date earlier than, the filing date of the present application.

&: Member of the same patent family, corresponding document.

Databases: The UK Patent Office database comprises classified citations of GB, EP, WO and US patent specifications as outlined periodically in the Official Journal (Patents). The on-line databases considered for search are also listed periodically in the Official Journal (Patents).